

Advanced Solid Oxide Cell Architecture and Materials for Durable, Regenerative Operation at Pressure, Phase I

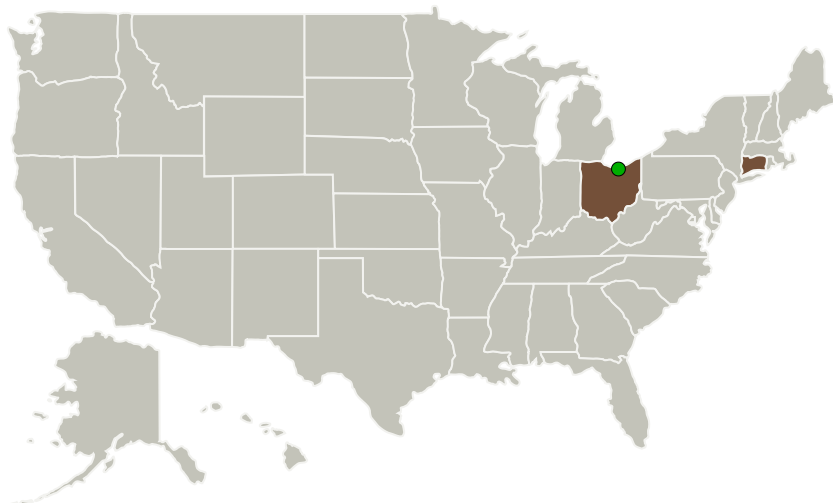
Completed Technology Project (2016 - 2016)



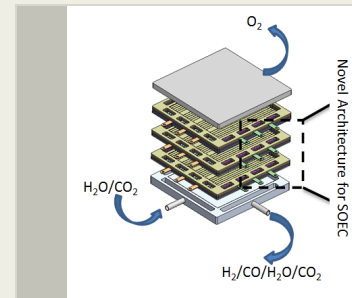
Project Introduction

PCI will develop and demonstrate advanced materials and innovative structural elements integrated within the stack for efficient H₂O/CO₂ electrolysis to overcome known SOEC shortcomings. The key focus will be to mitigate anode delamination and enable operation at high pressure differentials. Capability for effective regenerative operation will be examined. In Phase I proof of concept will be demonstrated and in Phase II a rigorous scaled hardware operating at pressure will be demonstrated. PCI has been at the nexus of various fuel cell generator development efforts and is collaborating with a University, as a major subcontractor, to bring to bear considerable expertise in demonstrating an innovative SOEC cell architecture. Additionally, PCI has been working with NASA on multiple atmosphere revitalization efforts for over 20 years and has acquired a comprehensive understanding of the requirements for long duration manned spaceflight and for In-Situ Resource Utilization architecture.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Precision Combustion, Inc.	Lead Organization	Industry	North Haven, Connecticut
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Primary U.S. Work Locations

Connecticut

Ohio

Project Transitions

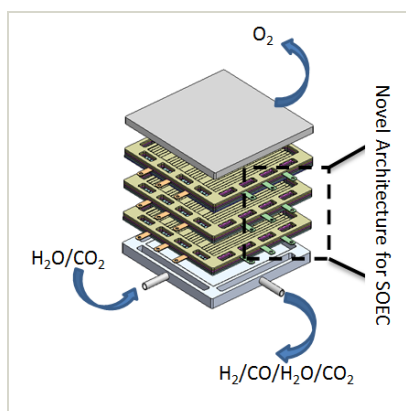
June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140497>)

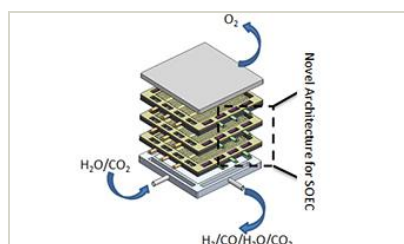
Images



Briefing Chart Image

Advanced Solid Oxide Cell Architecture and Materials for Durable, Regenerative Operation at Pressure, Phase I

(<https://techport.nasa.gov/image/133436>)



Final Summary Chart Image

Advanced Solid Oxide Cell Architecture and Materials for Durable, Regenerative Operation at Pressure, Phase I Project Image (<https://techport.nasa.gov/image/129234>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Precision Combustion, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

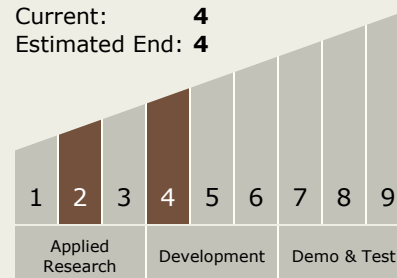
Saurabh Vilekar

Technology Maturity (TRL)

Start: 2

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.3 Advanced Concepts for Energy Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System